

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference P2324 PCT	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/CH2004/000365	International filing date (day/month/year) 17/06/2004	(Earliest) Priority Date (day/month/year) 12/01/2004
Applicant EIDGENOSSISCHE TECHNISCHE HOCHSCHULE ZURICH		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 7 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box II).

3. ☐ **Unity of invention is lacking** (see Box III).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

a. the figure of the **drawings** to be published with the abstract is Figure No. 1

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

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Box No. IV Text of the abstract (Continuation of item 5 of the first sheet)

A method of producing a device with a ferroelectric crystal thin film on a first substrate (12) comprises the steps of providing a ferroelectric crystal (1), of irradiating a first surface of said ferroelectric crystal with ions (2) so that a damaged layer (3) is created underneath said first surface, of bonding a block (19) of material including said first substrate (12) to said ferroelectric crystal to create a bonded element (21), wherein an interface is formed between said first surface and a second surface of said block, and of heating the bonded element and separating it at the damaged layer, so that a ferroelectric crystal layer (22) remains supported by the first substrate. By this method, very thin films - down to thicknesses a fraction of a micrometer - of ferroelectric crystals may be fabricated without jeopardizing the monocrystalline structure. According to a preferred embodiment, prior to bonding the block to the second substrate, the first substrate is provided with a electrode layer (13) prior to the bonding. In this way, a thin ferroelectric crystal layer may even be subjected to an applied voltage by electrodes.

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A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01L21/762 H01L41/22 G02B6/12 G02F1/39 G11C11/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01L G02B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/199105 A1 (HOBART KARL D ET AL) 23 October 2003 (2003-10-23) paragraphs [0026], [0027], [0030] - [0040], [0073] - [0075]	1-4,6, 8-13,20
Y	figures 1,2a,12	5,7,15
Y	----- MALEVILLE C ET AL: "MULTIPLE SOI LAYERS BY MULTIPLE SMART-CUT TRANSFERS" 2000 IEEE INTERNATIONAL SOI CONFERENCE PROCEEDINGS, WAKEFIELD, MA, OCT. 2 - 5, 2000, NEW YORK, NY, IEEE, US, 2 October 2000 (2000-10-02), pages 134-135, XP001003462 ISBN: 0-7803-6390-6 the whole document ----- -/--	5

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

23 December 2004

Date of mailing of the international search report

30.03.05

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 593 212 B1 (HOBART KARL D ET AL) 15 July 2003 (2003-07-15)	7,15
A	column 9, lines 26-67 figures 6a,6b,8 -----	16-18
X	US 6 540 827 B1 (OSGOOD JR RICHARD M ET AL) 1 April 2003 (2003-04-01) column 2, lines 27-41 column 10, lines 9-44 column 13, lines 41-51 figure 11 -----	1,4,10, 11
A	US 6 563 153 B2 (WIKBORG ERLAND ET AL) 13 May 2003 (2003-05-13) column 2, line 61 - column 3, line 23 -----	5,11
A	US 2002/039470 A1 (AMANTEA ROBERT ET AL) 4 April 2002 (2002-04-04) paragraphs [0049], [0050], [0053], [0065] -----	14,16,17
A	US 6 078 605 A (CHU SAI TAK ET AL) 20 June 2000 (2000-06-20) figure 4 -----	14
A	US 2003/223695 A1 (LI MING ET AL) 4 December 2003 (2003-12-04) paragraphs [0022] - [0026] figure 3 -----	14
A	US 6 661 950 B1 (STRECKER BRIAN N) 9 December 2003 (2003-12-09) column 1, line 66 - column 4, line 26 example 4 -----	14
A	US 6 195 187 B1 (LITTLE BRENT E ET AL) 27 February 2001 (2001-02-27) column 1, line 12 - column 2, line 27; figures 1a,1b,2 -----	16-18

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Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-18

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-18

Optical wavelength selective ferroelectric filter or switch comprising two waveguide branches and at least two micro-resonators.

2. claim: 19

Switchable ferroelectric out-coupler comprising an electrode for applying a periodic field to the ferroelectric material.

3. claims: 20-21

Pyroelectric sensor or ferroelectric memory device comprising an electrode layer between a substrate and a monocrystalline ferroelectric layer.

4. claims: 22-27

Ferroelectric parametric amplifier or frequency doubling device comprising a waveguide formed by a layered structure and a cladding, wherein the layered structure comprises either two or more ferroelectric layers having different spontaneous polarization or electrodes with a periodic pattern to achieve quasi phase matching.

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Information on patent family members

International Application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2003199105	A1	23-10-2003	NONE	
US 6593212	B1	15-07-2003	NONE	
US 6540827	B1	01-04-2003	US 2002053318 A1	09-05-2002
			US 6120597 A	19-09-2000
			AU 5303201 A	15-10-2001
			AU 8058301 A	30-01-2002
			WO 0175195 A2	11-10-2001
			WO 0206568 A2	24-01-2002
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			AU 5122600 A	14-11-2000
			CA 2365992 A1	19-10-2000
			CN 1371434 A	25-09-2002
			EP 1171653 A1	16-01-2002
			JP 2002541673 T	03-12-2002
			MX PA01010112 A	14-07-2003
			WO 0061841 A1	19-10-2000
			AU 2590699 A	30-08-1999
			CA 2320218 A1	19-08-1999
			CN 1291349 A	11-04-2001
			EP 1060509 A1	20-12-2000
			JP 2002503885 T	05-02-2002
			WO 9941779 A1	19-08-1999
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			AU 7472701 A	02-01-2002
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			SE 0002296 A	21-12-2001
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			US 2001054748 A1	27-12-2001
US 2002039470	A1	04-04-2002	US 2002039467 A1	04-04-2002
US 6078605	A	20-06-2000	NONE	
US 2003223695	A1	04-12-2003	JP 2004004871 A	08-01-2004
US 6661950	B1	09-12-2003	NONE	
US 6195187	B1	27-02-2001	NONE	